In the Claims

Please cancel claims 12-14 and 19-28, without prejudice, and amend claims 1, 5, 8, and 15 as follows:

1. (currently amended) An analytical furnace comprising:

a combustion furnace having a generally disk-shaped body with a cylindrical side wall;

a resistive heating element positioned within said side wall and extending around said furnace;

a crucible-holding platter positioned within said furnace and having a plurality of apertures therein;

a plurality of crucibles positioned within said apertures of said platter, wherein said crucibles hold samples for combustion within said furnace;

a control circuit for controlling the application of power to said heating element;

a first temperature sensor positioned in fixed relationship within said furnace for detecting the furnace temperature at said fixed location;

a second temperature sensor removably positionable within [~~a crucible~~] one of said crucibles positioned on [~~in operative relationship within~~] said [~~furnace~~] platter; and

wherein said control circuit includes a temperature modeling cycle for correlating the temperature between said first and second temperature sensors during a cycle of furnace temperature steps and developing in response thereto optimum temperature control signals for increasing crucible temperatures to desired temperature levels.

2. (original) The furnace as defined in claim 1 wherein said control circuit includes a processor which is programmed to measure temperatures from said first temperature sensor and said second temperature sensor and model the crucible temperature profile as a function of detected temperatures using a proportional, integral, and derivative (PID) process applied to temperature data obtained from said sensors.

3. (original) The furnace as defined in claim 2 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

4. (original) The furnace as defined in claim 3 wherein said modeling data is further determined using an auto-regressive moving average approximation.

5. (currently amended) A thermogravametric analyzer comprising:

a combustion furnace having a generally disk-shaped body including a cylindrical side wall [heating element];

a resistive heater positioned within said side wall and extending around said furnace;

a crucible-holding platter positioned within said furnace and having a plurality of apertures therein;

a plurality of crucibles positioned within said apertures of said platter, wherein said crucibles hold samples for combustion within said furnace;

first and second temperature sensors; and

a control circuit for controlling the application of power to said heating element, wherein said control circuit includes a processor which is programmed to measure the temperatures from [~~a~~] said first temperature sensor which is positioned in fixed relationship within said furnace for detecting the furnace temperature at said fixed location and [~~a~~] said second temperature sensor removably positionable within a crucible positioned on [~~in operative relationship within~~] said platter [~~furnace~~], [~~and~~] said control circuit modeling the crucible temperature profile as a function of detected furnace temperatures using a proportional, integral, and derivative (PID) process applied to temperature data obtained from said first and second temperature sensors [~~therefrom , the crucible temperature profile as a function of detected furnace temperatures~~].

6. (original) The furnace as defined in claim 5 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

7. (original) The furnace as defined in claim 6 wherein modeling data is further determined using an auto-regressive moving average approximation.

8. (currently amended) A thermogravametric analyzer comprising:

a furnace having a cylindrical sidewall;

a balance with a weigh platform positioned within said furnace;

a plurality of crucibles for holding samples for analysis;

a rotatable support for [~~a~~] holding said plurality of crucibles [~~which~~] wherein said support is rotated to sequentially [~~positions~~] position crucibles on [~~the~~] said weigh platform;

a heater within said cylindrical sidewall for heating [~~the~~] said furnace;

a pair of temperature sensors including a first temperature sensor positioned in fixed relationship within said furnace and a second temperature sensor movable to be positioned within a crucible on said support; and

a control circuit coupled to said temperature sensors, said circuit including a processor programmed to obtain temperature data to model the crucible temperature as the furnace temperature is varied and to subsequently control the furnace temperature during operation.

9. (original) The analyzer as defined in claim 8 wherein said processor is programmed to measure temperatures from said first temperature sensor and said second temperature sensor and model the crucible temperature profile as a function of detected temperatures using a proportional, integral, and derivative (PID) process applied to temperature data obtained from said sensors.

10. (original) The analyzer as defined in claim 9 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

11. (original) The analyzer as defined in claim 10 wherein modeling data is further determined using an auto-regressive moving average approximation.

12. - 14. (canceled)

15. (currently amended) A thermogravametric analyzer comprising:

a disk-shaped furnace having a heating element;

a control circuit for controlling the application of power to said heating element;

a crucible-holding platter including a plurality of apertures for holding sample-holding crucibles;

a first temperature sensor positioned in fixed relationship within said furnace for detecting the furnace temperature at said fixed location;

a second temperature sensor removably positionable within a crucible positioned [~~in operative relationship~~] on said platter within said furnace; and

wherein said control circuit includes a temperature modeling cycle for correlating the temperature between said first and second temperature sensors during a cycle of step-wise increasing furnace temperature steps and developing in response thereto optimum temperature control signals for raising crucible temperatures to desired temperature levels while minimizing temperature overshoot.

16. (original) The analyzer as defined in claim 15 wherein said control circuit includes a processor which is programmed to measure temperatures from said first temperature sensor and said second temperature sensor and model the crucible temperature profile as a function of

detected temperatures using a proportional, integral, and derivative (PID) process applied to temperature data obtained from said sensors.

17. (original) The analyzer as defined in claim 16 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

18. (original) The analyzer as defined in claim 17 wherein modeling data is further determined using an auto-regressive moving average approximation.

19. - 28. (canceled)